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POULTRY HYGIENE. PART 1. EXAMINATION AND EVALUATION OF POULTRY AND POULTRY PRODUCTS

Food and Drug Administration
Washington, D. C.

August 1959

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POULTRY HYGIENE

Part 1

Examination and Evaluation of Poultry and Poultry Products

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Food and Drug Administration **Public Health Service**

POULTRY HYGIENE

Part 1

EXAMINATION AND EVALUATION

OF POULTRY AND

POULTRY PRODUCTS

Recommendations on
Ante-Mortem and Post-Mortem
Inspection of Poultry for
Wholesomeness and
Freedom from Adulteration

Details of illustrations in this document may be better studied on microfiche

developed jointly by the

FOOD AND DRUG ADMINISTRATION
and the
PUBLIC HEALTH SERVICE

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Washington 25, D.C.

I

A related publication:

POULTRY ORDINANCE 1955 Edition
Public Health Service Publication No. 444.

Public Health Service Publication No. 683
Food and Drug Administration Technical Bulletin No. 2

1959

II-A

ERRATA

Page		
25	Figure 9	Should have caption: NEURAL LYMPHOMATOSIS
40	l. e.	The first word misspelled. Should be: Unkempt.
41	l. a.	Referenced page number should be: (... See page 9.)
	l. b.	Referenced page number should be: (... See page 9.)
47	e. The Kidneys.	Third sentence should read: Abnormal kidneys should be removed as a part of preparation of the carcass.
54	Flaccid	Insert comma after "flabby".
	Friable	The word "broken" should not be capitalized.

POULTRY HYGIENE PART I

Examination and Evaluation of
Poultry and Poultry Products

Public Health Service Publication No. 683
Food and Drug Administration Technical Bulletin No. 2

August 1959

II B

P R E F A C E

This publication is in recognition of the need for a stated uniform policy of the several Federal agencies having responsibility in this field and is intended to assure uniformity of administrative actions. The Public Health Service has already developed a recommended poultry ordinance for use by interested State and local agencies and the need for supplementary program guides is recognized.

These recommendations have been developed jointly by the Bureau of Program Planning and Appraisal and the Division of Public Information, Food and Drug Administration; and the Milk and Food Program, Division of Engineering Services, and the Veterinary Public Health Section, Epidemiology Branch, Communicable Disease Center, of the Bureau of State Services, Public Health Service. The U. S. Departments of Agriculture, Army, Air Force, and Navy also participated in this endeavor.

The Food and Drug Administration issued an early draft of this Manual in mimeographed form in 1957 as a guide for its District chiefs, and for other Federal, State and local enforcement and public health officials. Widespread approval followed along with many requests for a joint publication. The American Public Health Association in November 1957 issued a comprehensive statement on poultry inspection with a specific recommendation that the Food and Drug Administration and the Public Health Service expodite publication and distribution in a more permanent form and make it generally available.

Many States have adopted the Uniform Food, Drug, and Cosmetic Law, based on the Federal Food, Drug, and Cosmetic Act, for the control of foods in intrastate commerce. Furthermore, an increasing number of State and local agencies are developing poultry hygiene programs for intrastate poultry processing plants, to complement the Federal poultry inspection service conducted by the U. S. Department of Agriculture under the Poultry Products Inspection Act.

These recommendations are designed to be of value both to food and drug officials in the examination and evaluation of poultry and poultry products in commerce, and to State and local agencies as a reference document in the conduct of poultry hygiene programs in intrastate poultry processing establishments.

ACKNOWLEDGEMENTS

Appreciation is hereby expressed to the following poultry pathologists and research workers outside the Government for review of this Manual in draft form, and for their recommendations with respect to ante-mortem inspection, disposition of diseased carcasses, and other matters dealt with herein:

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Part 1
GENERAL PRINCIPLES

Modern concepts of meat hygiene; principles of poultry inspection; ante-mortem and post-mortem inspection procedures; disposal of unfit materials.

MODERN CONCEPTS OF MEAT HYGIENE

From a food inspection standpoint, taking into account public health considerations and consumer expectancy in the United States, poultry may become adulterated as a result of disease processes, decomposition, contamination with filth or poisonous substances, death otherwise than by slaughter, or other conditions making it unfit for food or unacceptable to the consumer.

Section 1 (a) of the Public Health Service Poultry Ordinance, developed for use by interested State and local agencies, defines adulterated poultry and poultry products as follows:

Adulterated: Poultry and poultry products shall be deemed to be adulterated:

(1) If they bear or contain any poisonous or deleterious substance which may render them injurious to health; but, in case the substance is not an added substance, such poultry and poultry products shall not be considered adulterated under this clause if the quantity of such substance in such poultry and poultry products does not ordinarily render them injurious to health.

(2) If they bear or contain any added poisonous or added deleterious substance, unless such substance is necessary in their production or unavoidable under good manufacturing practices and unless there are other provisions of law limiting the quantity of such added substance on or in such poultry and poultry products: Provided, That any quantity of such added substance exceeding the limits so fixed shall also be deemed to constitute adulteration.

(3) If they consist in whole or in part of any filthy, putrid, or decomposed substance, or if they are otherwise unfit for food.

(4) If they have been processed, prepared, packed, or held under insanitary conditions, whereby they may have become contaminated with filth, or whereby they may have been rendered injurious to health.

(5) If they are, in whole or in part, the product of diseased poultry or of poultry which has died otherwise than by slaughter.

(6) If their container is composed, in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health.

(7) If any substance has been substituted, wholly or in part, therefor.

(8) If damage or inferiority has been concealed in any manner.

(9) If any substance has been added thereto or mixed therewith which makes them appear better or of greater value than they are.

The definition above is based on that contained in the Federal Food, Drug, and Cosmetic Act. This Act, insofar as it applies to poultry, has now been superseded by the Federal Poultry Products Inspection Act (enacted in 1957, and fully effective January 1, 1959) to the extent of its application. The Federal Poultry Products Inspection Act contains definitions of adulterated and unwholesome which combined, are essentially equivalent to that above. Many States have adopted the Uniform Food, Drug, and Cosmetic Law, which is copied after the Federal Food Drug, and Cosmetic Act, and contains the same definition of adulteration. Other States and most large municipalities have general food laws or regulations which embody similar definitions and concepts of wholesomeness and acceptability of foods.

Under these modern concepts, poultry is considered diseased if:

1. It contains disease organisms or their toxins which are dangerous to the consumer.

2. It contains morbid tissue due to inflammation, degeneration, or neoplasia.

3. It is derived from an animal which shows evidence of a general systemic disturbance; e.g., fever. During fever, the metabolic rate is greatly increased and the end products of metabolism accumulate and cause changes in the tissues.

Therefore, poultry or poultry carcasses should be condemned if affected with any disease dangerous to man; with any generalized or systemic condition, or with any localized condition so extensive or of such nature as to have a generalized or systemic effect; or if affected by any other condition so extensive or repulsive as to render the entire carcass unacceptable to the consumer.

Furthermore, if the condition is confined to a small part of the carcass, or to particular organs, and if not of such nature as to warrant condemnation of the entire carcass, all affected parts should be removed in a sanitary manner and condemned. Any edible part which is contaminated by dangerous, purulent, or obnoxious material during the removal of affected parts should likewise be removed and condemned.

It is impracticable to formulate recommendations covering every disease or to designate at just what stage every condition may become a health hazard or become repugnant. Signs and lesions of a disease may vary widely and upon inspection may not be differentiated from those

caused by other diseases. Therefore, it is often impossible to make a definite diagnosis without resorting to laboratory studies. In each instance, the inspector should make a decision based upon the specific signs, lesions or other factors present in determining whether the bird or carcass is affected by disease or other condition to the extent that it is unsafe or otherwise adulterated in whole or in part. In the case of disease processes, it is usually sufficient for this purpose to reach a presumptive diagnosis or a determination of generalized involvement. Plant employee health hazards or animal disease control problems in certain situations may, of course, require further diagnostic work.

In addition to the essentials listed above, it is important that laboratory services be available to and utilized by the inspection agency in those cases where verification of the judgment of the inspector is desired, and for the purpose of identifying uncommon or obscure diseases or other abnormalities.

PRINCIPLES OF POULTRY INSPECTION

The Poultry Products Inspection Act provides that the U. S. Department of Agriculture shall inspect for wholesomeness all poultry slaughtered and processed in plants which engage in interstate commerce. However, a large number of intrastate poultry processing establishments are not under Federal supervision. Effective State and local poultry inspection services are needed in these establishments to prevent them from becoming a dumping ground for sick flocks and to assure the wholesomeness of poultry processed and distributed intrastate. Ante-mortem and post-mortem inspection by professionally trained, experienced inspectors has been recognized for many years as necessary for the adequate detection and evaluation of disease processes and other conditions affecting the wholesomeness of "red meat" animals. Such inspection is equally necessary for the evaluation of poultry.

The legend, "Inspected for Wholesomeness," or its equivalent, is a visual representation of the governmental authority under which it is applied. It means to the purchaser that every reasonable and practicable precaution has been taken to eliminate unwholesome birds. If this is not done, the official legend is actually misleading to the consumer. Therefore, the following are recommended as cardinal principles for State and municipal poultry inspection services:

1. The inspecting and supervisory staff should be competent and there should be a sufficient number of professional workers available to assure scientifically accurate disposition of all carcasses.

2. The members of the staff should be free from political and economic pressure. This means not only tenure of office so long as they competently perform this work, but also, remuneration commensurate with training, experience, and living standards.

3. The organization of the inspection service should be such that the administrator feels responsible to the consumer and that the same concept is instilled in his entire staff. The administrator should, of course, have full authority to control the actions of his subordinates and be held responsible for their actions. In so doing, he should have sufficient competent supervisory personnel.

4. No one connected with the inspection service should have a financial interest in the product or in a competing product.

5. The administrator should have authority to require proper plant equipment and facilities.

The actual performance of ante-mortem and post-mortem inspection consists of two essentials, (1) recognizing as such any abnormalities present, and (2) evaluating each abnormality and making proper disposition of the affected bird or carcass.

It has been found that, following adequate instruction and experience and under proper supervision, laymen can become qualified to serve effectively in the conduct of inspection insofar as the first essential is concerned, by sorting abnormal birds or carcasses from those that are normal. Such properly trained lay persons also may serve in the supervision of processing, labeling, sanitary control, and acceptance of previously inspected products. Thus, adequately trained lay inspectors can fulfill the consumer protection requirements of the inspection programs, and assure reasonable compliance with food laws, if all abnormal birds are condemned.

Proper supervision of the lay inspector should, if possible, include frequent periodic review by a professionally trained inspector of the poultry being passed, as a precaution in case of the occurrence of unusual diseases or conditions outside the experience and training of the lay inspector, and to assure the maintenance of satisfactory performance by the latter. Moreover, close supervision by a veterinarian and observation of all abnormal live poultry and carcasses will facilitate prompt cooperation with physicians and livestock disease control officials where indicated to enable prompt action for protection of the health of plant employees in the event of occurrence of outbreaks of disease directly communicable to man, for the tracing of certain diseases to the flocks of origin, and for the establishment of necessary disease control measures

or research studies. The latter considerations may prove to be vitally important in the event of accidental or intentional introduction into the United States of new disease organisms or of strains which are more pathogenic or dangerous to poultry or to man than those commonly identified in the United States; e.g., highly fatal Newcastle disease or fowl plague, or the apparent adaptation of highly pathogenic agents to species not known previously to be affected; e.g., psittacosis.

"WARM" EVISCERATION

It is essential that sick birds be condemned, insofar as possible, prior to slaughter rather than after they have been permitted to contaminate scald water, chill water, processing equipment and other poultry or products, and may have exposed plant employees to the danger of infection. Many birds which upon ante-mortem inspection are obviously sick will not show after slaughter lesions of disease which will be recognized or which can be properly evaluated in the few seconds available for post-mortem inspection as usually done.

Conversely, even though signs of illness may not be apparent upon ante-mortem inspection, lesions of disease may be found upon post-mortem inspection.

Therefore, for most effective consideration and evaluation of disease conditions in poultry, both ante-mortem and post-mortem inspection are necessary. Furthermore, evisceration and post-mortem inspection should follow immediately after slaughter and removal of the feathers, for the following reasons:

(a) To permit correlation of ante-mortem and post-mortem findings, and the conduct of any human or animal disease control measures indicated.

(b) The chilling in cracked ice, in ice slush or water, packing or shipping in cracked ice, or the freezing and defrosting of New York dressed poultry as practiced, results in contamination of the carcass with filth; e.g., fecal material and exudates from the sinuses of the head and from the respiratory system. The contamination may extend into the lungs, and possibly into the air sacs, in the case of water or ice slush chilling.

(c) These same practices are likewise conducive to cross-contamination of carcasses with organisms from diseased or carrier birds which have not been eliminated on ante-mortem inspection.

(d) The changes which may occur in the appearance or consistency of organs or tissues with the passage of time, or as a result of chilling or freezing, may prevent adequate post-mortem evaluation under the usual conditions of post-mortem inspection.

ANTE-MORTEM INSPECTION[1/]

(See Part III for discussion of significance of ante-mortem findings.)

1. Procedure

Lots of live poultry should be observed upon arrival if practicable, and in any event prior to slaughter on the day thereof. The inspector should look at the birds in the battery, coop or pen, and make such further examination of individual birds as he considers necessary to determine disposition.

The ante-mortem inspection should be so conducted as to prevent birds which should be condemned or slaughtered separately as suspects from being processed along with the healthy poultry. Otherwise, contamination of healthy carcasses may result, and unfit carcasses may be inadvertently passed for human consumption.

2. Disposition of Sick Birds

a. Conditions necessitating Condemnation on Ante-Mortem Inspection

Birds which are obviously sick, or which on ante-mortem inspection show any condition that would cause condemnation of their carcasses on post-mortem inspection, should be condemned and promptly disposed of in accordance with paragraph 2.d. of this subpart and 3. of subpart C (Post-Mortem Inspection).

b. Conditions Necessitating Segregation as Suspects for Separate Slaughter and Post-Mortem Inspection

Excepting in cases of an oberved or suspected high incidence of disease, which should be handled as under c. below, birds which do not exhibit ante-mortem signs justifying condemnation without post-mortem examination, but which are suspected of being ill either on the basis of their appearance or because of information available regarding the history of the flock, should be identified as suspects; segregated, and slaughtered; dressed and eviscerated; and subjected to post-mortem inspection separately from the apparently healthy poultry. Suspects should be

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1/ Adapted from Instruction No. 918 (PY) Ante-Mortem-1, Ante-Mortem Inspection of Poultry, United States Department of Agriculture, Production and Marketing Administration, February 28, 1952.

the last birds processed before the close of operations for the day; or, when more practicable, at the end of processing of given flocks or lots. In any case, after being used in the processing of suspect birds, all processing equipment should be thoroughly washed, rinsed, and subjected to an effective bactericidal treatment before being used again for the processing of apparently healthy birds.

A procedure will be needed for maintaining the identity of suspect birds and for informing the post-mortem inspector of the nature of the signs observed or illness suspected and any special procedure that may be indicated (i.e., such as close examination of the crop and its contents, or the lungs and upper respiratory tract), and allow him promptly to correlate post-mortem findings with ante-mortem appearance or history. (Report forms or numbered or color-coded leg bands may be useful.)

c. High Rate of Infection; Suspect Lots

If, upon ante-mortem inspection, a lot of birds is found to contain a relatively large number of sick birds or if a large percentage of the birds is suspected of being infected, one of two alternative procedures may be followed. Where it is practicable, and conditions warrant it, all or part of such a lot of poultry may be released for observation or treatment under the supervision of the state livestock sanitary authority. In the alternative, all obviously sick birds should be removed immediately and condemned, and the remainder should be slaughtered, dressed, eviscerated, and submitted for post-mortem inspection as suspects in accordance with the procedures outlined in b. above. Whatever additional precautions are deemed necessary should be taken to prevent the spread of any contagious disease. If indicated, the state livestock sanitary authority should be notified concerning vehicles used in transporting sick lots of poultry, so that the vehicles may be decontaminated before reuse. Batteries used for sick or suspected birds should be cleaned and disinfected before being used again.

The correlated ante-mortem and post-mortem inspection in accordance with the principles outlined herein will ordinarily result in detection of diseased birds and thus enable health officials to provide better consumer protection under ordinary circumstances. However, in any flock or lot in which the number of sick birds is unusually large, or very rapidly increasing, full protection of the consumer and the plant employee (particularly the latter from Newcastle disease and psittacosis), may require that the flock or lot be withheld from market or slaughter.

and proper treatment administered, or held under observation, until the epidemic is under control. Proper course of action will have to be determined on the basis of all information available on the history of the flock and the probable disease involved.

d. Disposition of Condemned Live Poultry

All birds which on ante-mortem inspection are condemned, should be killed and promptly denatured or destroyed so as to prevent use for human food and preclude dissemination of disease through consumption by animals. Condemned birds should neither be dressed nor conveyed to or within any department of the establishment used for edible products.

POST-MORTEM INSPECTION[2/]

(See Parts II and III for discussion of significance of post-mortem findings.)

1. Procedure

To prevent contamination of edible tissues, the carcass should be carefully opened and the entire viscera, with the exception of the lungs, gonads, and kidneys, removed intact and left suspended by a partial attachment at the vent area (or placed in a pan or on the eviscerating table if the suspension system is not used). The viscera and both the inner and outer surfaces of the carcass should be exposed for convenient observation by the inspector.

The inspector should examine the viscera visually and by palpation. This may be readily accomplished with the gizzard lying in the palm so that the liver and spleen can be easily observed and manipulated.

The intestines should be examined for evidence of enteritis, peritoneal adhesions, neoplasia, or other pathologic alterations; the gizzard for foreign body penetration, and again after cleaning, for gizzard worm infection or evidence of muscular necrosis.

The liver and spleen should be examined for congestion, friability, enlargement, or changes in color; and for tuberculous, tumorous, necrotic or other lesions. The heart should be examined for pericarditis, necrosis, extensive hemorrhages, tumors, urate deposits, and other abnormalities.

2/ Adapted from "Procedure and Technique for Poultry Inspection" by P. J. Brandly, Journal of the American Veterinary Medical Association, Vol. CXIV, June 1949, pp. 393-396.

The exterior and interior surfaces of the carcass should be observed and any abnormalities correlated with the condition of the viscera. If lesions of the lungs are observed or suspected, the lungs must be removed for examination. Lesions of chronic respiratory disease, tuberculosis, aspergillosis, leukosis, pullorum disease, and typhoid are most frequently found. Abscesses may also be observed. Contamination of the lungs with scald water may indicate similar contamination of the air sacs.

The kidneys may be neoplastic, mottled, congested, swollen, atrophied or anemic; or may contain deposits of urates; or show a combination of these changes.

The skin, musculature and fascia should be observed for changes in color and consistency. Darkening and dehydration of the flesh and skin, which always accompany prolonged fever, are of great significance. Marked alteration of the skin and muscle, even without other gross lesions or evidence of disease, warrants condemnation of the carcass. When semi-scald is used, normal variations can be readily differentiated from those resulting from a pathologic condition in which the flesh becomes dehydrated and sticky, the skin drier and darker in color, and in which the fascia take on an adhesive quality. However, if higher temperatures are used, the result may be a removal of the epidermal layer of the skin and an almost uniformly white appearance in the dressed carcass. Thus, the darkened appearance otherwise associated with certain septicemias, and the abnormally pale (anemic) appearance caused by some disease processes, may be masked or obliterated. This emphasizes the necessity for removal of all visibly sick birds on ante-mortem inspection.

The inspector should look for evidence of emaciation, anemia, lesions caused by parasites, insanitation in processing operations, contamination, overscald, mutilation, death other than by slaughter, and other significant conditions.

Not an immediate part of the post-mortem inspectional procedure, but associated with it, is the necessity for routinely inspecting the "finished" product to ascertain whether inedible parts have been removed, for cleanliness, and for freedom from contamination and any other adulteration.

DISPOSAL OF UNFIT CARCASSES AND PARTS

All poultry carcasses or parts which are condemned as unfit for human consumption should be disposed of by one of the following methods:

(a) Incineration

Complete destruction by burning.

(b) Chemical Denaturing

Subjection to a liberal application of crude oil, kerosene or other suitable material so as to preclude use for human consumption.

(c) Tanking

Processing the condemned product in a pressure tank, commonly known as "tanking," under at least 40 pounds of steam pressure maintained for a sufficient time to effectively destroy it for human food purposes.

REFERENCES

BRANDLY, P. J. "Poultry Inspection as Part of the Public Health Program," Journal of the American Veterinary Medical Association CXII: 10-17

BRANDLY, P. J. "Procedure and Technique for Poultry Inspection," Journal of the American Veterinary Medical Association CXIV: 393-396

BRANDLY, P. J. "Efficient Poultry Inspection Service" Veterinary Medicine XLVI, No. 8, August 1951

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Part II
SIGNIFICANCE OF DISEASES AND OTHER CONDITIONS: DISPOSITION OF DISEASED CARCASSES

Significance to the consumer of diseases and other objectionable conditions; effect upon the wholesomeness or fitness of the poultry for human consumption; recommendations for the disposition of affected poultry.

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DISCUSSION OF DISEASES: PATHOLOGICAL CONSIDERATIONS

Part I of this Manual sets forth modern concepts of food hygiene as applied to diseased poultry. The principles stated there should be applied in determining whether a poultry carcass is diseased to any extent, and if so, whether the entire carcass is affected. Where evidence of disease is present, it is necessary to determine whether the condition is local, and hence susceptible of complete removal, and having no effect whatever on the remainder of the carcass; or whether a generalized or "systemic" involvement is probable, requiring condemnation of the entire carcass.

In this Part are discussed the pathological and other considerations upon which the recommended disposition was reached in each case.

(See page 26 for composite summary of recommendations for disposition of diseased carcasses.)

SOME GENERAL CONSIDERATIONS

In considering the significance of disease processes in poultry, certain anatomical and physiological characteristics of the domestic fowl, as contrasted to mammals, are important.

The respiratory system of the fowl includes not only the lungs, but also the air sacs. These air sacs connect directly with the primary and secondary bronchi and extend widely throughout the body cavity, as well as into certain of the cervical and thoracic vertebrae, the bones of the shoulder girdle, the humerus, sternal ribs, sternum, sacrum, and pelvic bones, and the intermuscular spaces of the shoulder. Consequently, respiratory infections commonly extend beyond the upper respiratory tract and the lungs, and affect the air sacs; thus diseased tissues may be located in otherwise edible portions of the carcass.

The anatomical character of the respiratory system of birds is not conducive to the expulsion of mucous and other material from the bronchi, trachea, and larynx. Thus, simple localized infections of the upper respiratory tract may result in a plugging of the trachea, difficult respiration, cyanosis and death.

The extent of the air sacs and their ready access to the outside create a hazard of contamination with fluids. For example, when uneviscerated carcasses are chilled in water or ice slush, the badly contaminated water may not only enter the lungs but the air sacs as well. Thus there is a possibility of extensive contamination. If

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a bird enters the scald tank before death, and the trachea is not severed as part of the bleeding operation, water may be drawn into the air sacs by the dying gasps of the bird, resulting in contamination and seeding of the body cavity with the filth and microorganisms present in the scald water.

The lymphatic system of the bird is different from that in mammals. While the examination of lymph nodes draining specific organs or parts has a major significance in the inspection of mammalian animals and carcasses, the character of the lymphatic system in birds does not enable similar use of this system for the guidance of the poultry inspector.

In judging the fitness of mature fowl, the appearance of the ovaries and oviduct and the presence or absence of eggs in the oviduct should be considered in relation to other signs or lesions. When affected by an acute infection or other serious condition, the flock is likely immediately to cease egg production, and the oviducts of affected birds will be empty and the ova regressive. The bird in active egg production is generally in good health, even though a localized condition or signs of recovery from a generalized infection may be apparent.

SPECIAL CONSIDERATIONS REGARDING RESPIRATORY DISEASES

The respiratory diseases as a group are of unusual interest because:

a. The air sacs extend into the body cavity, intramuscular spaces, and hollow bones and infections of the respiratory system often involve the edible parts.

b. This group includes Newcastle disease and psittacosis which are transmissible to man. No instances of man having contracted these diseases from ready-to-cook poultry are known, however.

c. The signs and lesions of these diseases may vary greatly and often have a close resemblance or are identical; thus, differentiation without extensive laboratory procedures is often impossible. However, ante-mortem inspection and history of the flock will be helpful.

Flocks containing a relatively large number of birds exhibiting signs of respiratory infection should not be marketed.

Where it appears that inflammation is confined to the air sacs, and possibility of their removal is considered, the air sacs in the shoulder muscle, and around the wing and hip joints, must not be overlooked.

Parts of the carcass contaminated with exudates from the air sacs should be removed and condemned. When the air sacs are ruptured, thus releasing exudates within the abdominal cavity, a substantial part of the carcass will be contaminated.

DISCUSSION OF INDIVIDUAL DISEASES

1. PSITTACOSIS OR ORNITHOSIS

Discussion

See under "Respiratory Diseases" above. Psittacosis or ornithosis is a virus infection. Psittacosis in man is characterized by a pneumonitis or pneumonia. Provided that effective inspection eliminates birds showing clinical signs and carcasses with grossly-visible lesions, evidence to date indicates this disease in poultry to be only an occupational hazard. Birds may harbor the virus and show only slight air sac lesions. This emphasizes the importance of careful ante-mortem inspection to prevent infected flocks from entering the plant; or to insure processing under such conditions as prescribed by health authorities to protect the health of the employees.

Recommended Disposition

Carcasses of poultry affected with psittacosis should be condemned. When psittacosis is suspected on basis of history or other information, carcasses showing lesions which may be due to psittacosis, if not immediately condemned, should be held for laboratory diagnosis.

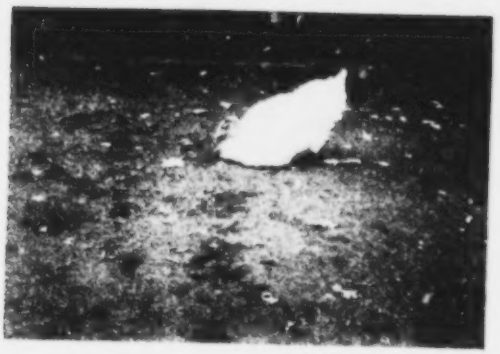
2. NEWCASTLE DISEASE

Discussion

See under "Respiratory Diseases" above. Newcastle disease (avian pneumoencephalitis) is a highly contagious and destructive malady which attacks chiefly chickens and turkeys. It is also infectious to other birds as well as certain mammals. Conjunctivitis may result in man from contact with poultry having this virus infection. Septicemic infection in man, with fever, headaches, chills, and malaise, has been reported. Gross diagnosis of the "nervous form" of this disease in poultry depends upon ante-mortem inspection. Post-mortem lesions resemble those frequently caused by other respiratory diseases such as infectious bronchitis, laryngotracheitis, coryza, or chronic respiratory disease; or by leukosis, mycosis, or pullorum disease.

Figure 1

(1)



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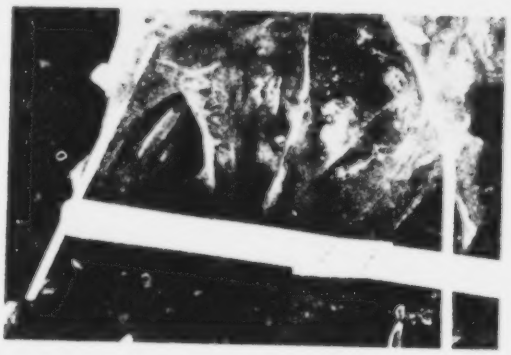

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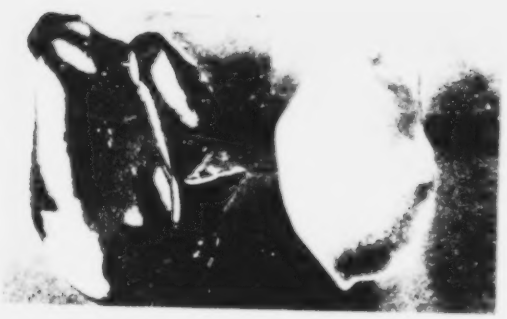


ORNITHOSIS, TURKEY

(1) Characteristic ante mortem posture
(2) Air Sac involvement
(3) Enlarged Liver and Pericarditis
(4) Infected and normal Liver

-- USDA Photo

Recommended Disposition

Carcasses of poultry affected with Newcastle disease in a progressive stage, or showing a general systemic disturbance, should be condemned. When the lesions are regressive and of such character and extent that there is no general systemic disturbance, only the affected parts need be condemned.

3. CHRONIC RESPIRATORY DISEASE - INFECTIOUS SINUSITUS OF TURKEYS

Discussion

See under "Respiratory Diseases" above. This disease causes lesions of an inflammatory nature and is generally characterized by a slow onset and long duration. It may accompany, follow, or resemble other respiratory infections.

Recommended Disposition

Any organ or part of a carcass which is affected by chronic respiratory disease should be condemned, and if there is evidence of general systemic disturbance, the whole carcass should be condemned.

4. INFECTIOUS LARYNGOTRACHEITIS

Discussion

See under "Respiratory Diseases" above. This is an acute, contagious respiratory disease of chickens caused by a virus, which usually produces grossly-visible morbid changes of the mucous membranes of the head and trachea. The respiratory involvement frequently causes death by asphyxiation.

Recommended Disposition

Carcasses of poultry affected with infectious laryngotracheitis in a progressive stage, or showing a general systemic disturbance, should be condemned. When the lesions are regressive and of such character and extent that there is no general systemic disturbance, only the affected parts need be condemned.

5. INFECTIOUS CORYZA - (Figure 4 - Page 23)

Discussion

See under "Respiratory Diseases" above. Infectious coryza is caused by Hemophilus gallinarum. It may resemble or accompany other respiratory diseases.

Recommended Disposition

Carcasses of poultry affected with infectious coryza in a progressive stage, or showing a general systemic disturbance, should be condemned. When the lesions are regressive and of such character and extent that there is no general systemic disturbance, only the affected parts need be condemned.

6. SALMONELLOSIS (PARATYPHOID INFECTION) (Excluding Fowl Typhoid and Pullorum Disease)

Discussion

Carcasses of infected birds contain organisms (various species of Salmonella) dangerous to man. Food-borne outbreaks of salmonellosis in man are frequently attributed to poultry and poultry products. The types of Salmonella most frequently identified in human cases of salmonellosis are among the types commonly found in poultry. Generalized salmonellosis is a septicemic infection with serious consequences to the affected bird. Chronically infected or carrier birds may discharge viable organisms in the feces even though showing no evidence of illness. This emphasizes the danger associated with fecal contamination of the otherwise edible tissues.

Recommended Disposition

Carcasses of poultry affected with salmonellosis should be condemned.

7. PULLORUM DISEASE

Discussion

Pullorum disease is caused by Salmonella Pullorum. Salmonella pullorum is not as highly infective for man as some of the other Salmonellas, but food-borne infection has occurred. The infection in mature birds is usually chronic in nature and frequently localized in the gonads.

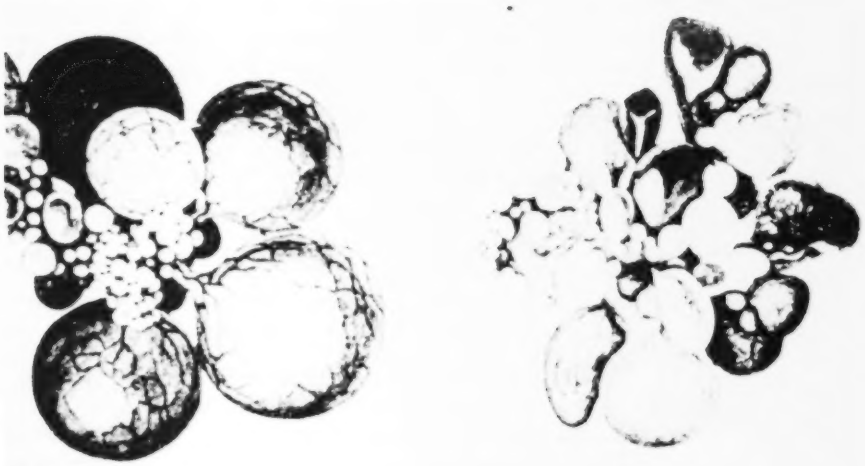
Recommended Disposition

Carcasses of poultry extensively affected with pullorum disease, or showing a general systemic disturbance, should be condemned. When the lesions are localized and there is no general systemic disturbance, only the affected parts need be condemned.

Figure 2

SALMONELLOSIS, TURKEY - Liver and Spleen lesions.

Figure 3



PULLORUM, CHICKEN - Normal and infected ovary.

-- USDA Photos

8. FOWL TYPHOID

Discussion

Fowl typhoid is a septicemic disease of domesticated birds, which follows either an acute or chronic course. It is caused by Salmonella gallinarum. This organism has been the cause of infrequent food-borne outbreaks in man. Fowl typhoid causes a general systemic disturbance in the affected bird.

Recommended Disposition

Carcasses of poultry affected with fowl typhoid in a progressive stage, or showing a general systemic disturbance, should be condemned. When the lesions are regressive and of such character and extent that there is no general systemic disturbance, only the affected parts need be condemned.

9. TUBERCULOSIS

Discussion

Avian tuberculosis, caused by Mycobacterium tuberculosis avium, affects man, although rarely. Tuberculosis of birds is usually an insidious, progressive, and fatal disease frequently characterized by a tuberculous bacillemia. Apparently recovery is infrequent. Any visible tubercular lesion calls for condemnation because of the probability that the organism has entered the general circulation and that tubercles are forming in the bone marrow and other organs or parts even though not grossly visible.

Recommended Disposition

Carcasses of poultry affected with tuberculosis should be condemned.

10. PSEUDOTUBERCULOSIS

Discussion

Pseudotuberculosis is caused by Pasteurella pseudotuberculosis. This organism is infectious to man, although relatively few human cases have been diagnosed. Of 16 reported cases, 14 proved fatal. If the acute septicemia in the bird is not fatal, a chronic focalized infection usually follows, giving rise to tuberculous lesions. Morbid tissues and the organisms dangerous to man are present.

Recommended Disposition

Carcasses of poultry affected with pseudotuberculosis should be condemned.

Figure 4

INFECTIOUS CORYZA, CHICKEN

Figure 5

TUBERCULOSIS, CHICKEN - Lesions in liver and spleen.

-- USDA Photos

11. VISCERAL LYMPHOMATOSIS

Discussion

A transmissible neoplastic disease, visceral lymphomatosis principally affects the large abdominal glands, such as the liver and kidney, but any organ of the body, including the skin may be affected. Typical of the disease is massive accumulation in various organs of proliferating lymphoid cells, often more widely distributed than gross appearance would indicate.

Recommended Disposition

Carcasses of poultry affected with visceral lymphomatosis should be condemned.

12. NEURAL LYMPHOMATOSIS

Discussion

The clinical signs of this disease are usually those of asymmetric progressive paresis of the leg, wing, or neck. Locomotive disturbances are often associated with systemic reactions such as loss of weight, paleness, anorexia, and diarrhea.

Recommended Disposition

Carcasses of poultry affected with neural lymphomatosis should be condemned.

13. OSTEOPETROSIS - (Figure 10 - Page 29)

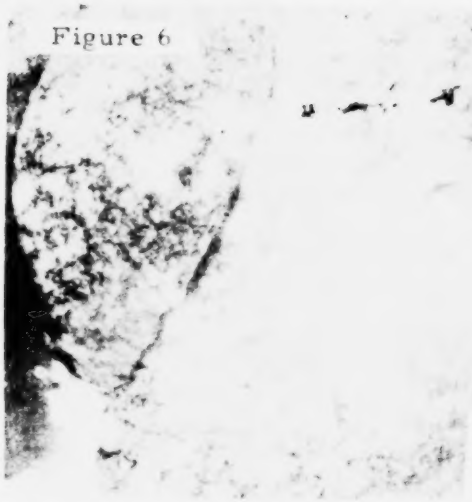
Discussion

This disease causes gross alterations in the long bones of the extremities, in the bones of the pelvis and shoulder girdle, and, rarely, in the spine. Visceral lesions are macroscopically or microscopically evident. Progressive reduction of blood-forming tissues frequently causes anemia.

Recommended Disposition

Carcasses of poultry affected by osteopetrosis should be condemned.

Figure 6



Liver

Figure 7

Skin lesions

Figure 4

Neural lesions.

Figure

Skin lesions on legs, breast & wings.

-- USDA Photos

14. ERYTHROBLASTOSIS and GRANULOBLASTOSIS

Discussion

Characterized by massive proliferation of essential blood-forming cells, these diseases have a marked detrimental effect on the general health of the bird.

Recommended Disposition

Carcasses of poultry affected by erythroblastosis or granuloblastosis should be condemned.

15. TUMORS

Discussion

Tumorous tissue is unfit for use as food. Tumors render the entire carcass unfit if there is evidence of general systemic disturbance or of metastasis.

Recommended Disposition

Any organ or part of a carcass which is affected by a tumor should be condemned. When there is evidence of metastasis, or that the general condition of the bird has been affected by the size, position, or nature of the tumor, the whole carcass should be condemned.

16. LISTERIOSIS (Listerellosis)

Discussion

The organism (*Listeria monocytogenes*) causes meningitis in man and has been found in the blood of patients with an infectious mononucleosis-like syndrome. It causes a septicemia in poultry, with large necrotic lesions in the heart. The tissues of infected birds contain morbid and necrotic tissue and organisms potentially dangerous to man. Septicemia invariably results in a general systemic disturbance of the affected bird.

Recommended Disposition

Carcasses of poultry affected with listeriosis should be condemned.

17. FOWL CHOLERA

Discussion

Fowl cholera is caused by Pasteurella multocida. Man may be infected by Pasteurella multocida, although relatively few cases have been diagnosed; it may cause a septicemia (usually fatal), respiratory infection, meningitis, localized infection of the hands, or abscess formation. Fowl cholera is characteristically a septicemic infection, usually fatal. Birds that survive often become carriers, with localized foci of infection in various organs and parts.

Recommended Disposition

Carcasses of poultry affected with fowl cholera in a progressive stage, or showing a general systemic disturbance, should be condemned. When the lesions are regressive and of such character and extent that there is no general systemic disturbance, only the affected parts need be condemned.

18. ERYSIPELOTHRIX INFECTION

Discussion

This disease is caused by the same organism (Erysipelothrix rhusiopathiae) that causes erysipeloid in man and infection in swine and other mammals. Thus, the tissues, including bone marrow, of infected birds contain organisms dangerous to man, and also morbid and necrotic tissue. This is primarily a septicemic disease in poultry.

Recommended Disposition

Carcasses of poultry affected with erysipelothrix infection should be condemned.

19. BOTULISM (Limber Neck)

Discussion

This is a toxemia caused by the toxin Clostridium botulinium, Type A or Type C in poultry. True botulism in commercially produced poultry is relatively uncommon. However, Type A botulinus toxin is extremely poisonous to man as well as other animals and any birds affected with botulism would be dangerous.

Recommended Disposition

Carcasses of poultry affected with botulism should be condemned.

20. FOWL POX

Discussion

Fowl Pox is caused by a virus. Although the disease is not transmissible to man, it causes a general systemic disturbance in the bird, and may result in death.

Recommended Disposition

Carcasses of poultry affected with fowl pox in a progressive stage, showing general systemic disturbance, or bearing grossly visible lesions, should be condemned.

21. COCCIDIOSIS

Discussion

Coccidiosis in poultry is caused by various species of coccidia, which are protozoan parasites. The disease may occur in birds of marketable age.

Recommended Disposition

Carcasses affected with frank or acute coccidiosis, and any other carcasses showing general systemic disturbance, should be condemned.

22. INFECTIOUS ENTEROHEPATITIS (BLACKHEAD, HISTOMONIASIS)

Discussion

Infectious enterohepatitis is caused by a protozoan parasite, Histomonas meleagridis. This disease has serious effect on the bird, often resulting in death. In a bird which has recovered, the liver may be damaged to an extent requiring its condemnation even though there is no residual effect on the general health of the bird.

Recommended Disposition

Carcasses affected with infectious enterohepatitis should be condemned. When recovery has occurred, and when the residual lesions are of such nature and extent that there is no general systemic disturbance, only the parts containing residual lesions need be condemned.

Figure 10

OSTEOPETROSIS - Chicken.

Figure 11

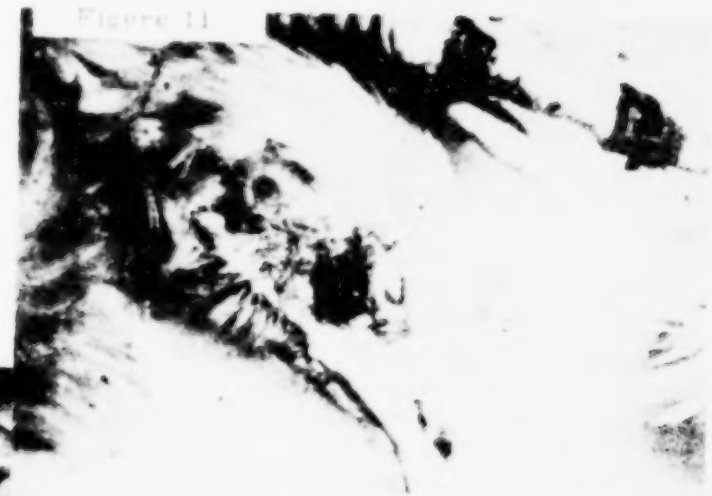


Figure 12

ENTEROHEPATITIS, TURKEY - C

SEVERE CASE OF FOWL PO

23. TRICHOMONIASIS OF UPPER DIGESTIVE TRACT

Discussion

Trichomoniasis is caused by the protozoan parasite, Trichomonas gallinae. It is usually prolonged in course, resulting in emaciation prior to death.

Recommended Disposition

Carcasses of poultry showing general systemic disturbance from trichomoniasis should be condemned.

24. PARASITISM (OTHER THAN COCCIDIOSIS, INFECTIOUS ENTEROHEPATITIS, AND TRICHOMONIASIS)

Discussion

Coccidiosis, infectious enterohepatitis, and trichomoniasis have been discussed elsewhere. The importance of other forms of parasitism depends upon the severity of infestation or infection.

Recommended Disposition

Affected organs and parts should be condemned; e.g., gizzards infected by gizzard worms. When feet and shanks are being saved for food, those affected by scaly-leg mites should be condemned. In other instances, if signs or lesions indicate an extensive or generalized effect, condemnation should be based upon the systemic alterations manifested.

25. INFLAMMATORY PROCESSES

Discussion

Inflammatory processes are the reactions of the tissues to injury; e.g., due to trauma, irritation, foreign bodies, toxins, or microorganisms. Inflammatory processes may be localized, affecting only the adjacent tissues or the individual organ, or they may cause or be associated with a generalized condition.

Recommended Disposition

Any organ or part of a carcass affected by an inflammatory process should be condemned, and if there is evidence of general systemic disturbance, the whole carcass should be condemned. This applies, for example, to carcasses showing enteritis, pericarditis, salpingitis, tendovaginitis, inflamed air sacs, pneumonia, pleurisy, peritonitis, arthritis, abscesses, suppurative sores, and the like. If there is no evidence of general systemic disturbance, only lesions and affected tissues, organs, and parts need be condemned.

26. EMACIATION

Discussion

Emaciation is characterized by extreme thinness, moist gelatinous tissues and absence of fat, indicating the prolonged systemic effect of disease or starvation on the metabolism of the bird.

Recommended Disposition

Carcasses of poultry affected with emaciation should be condemned.

27. OTHER DISEASE CONDITIONS

Other disease conditions should be evaluated in accordance with the principles outlined in Part I.

28. OTHER CONDITIONS

a. Bruises

Badly bruised tissues are very susceptible to contamination and bacterial growth, and decompose more quickly than normal tissues; they are repugnant to the senses and hence unacceptable for food. Upon evisceration, any part of a carcass which is badly bruised should be condemned. If all or a substantial part of the carcass, or the general health of the bird has been affected by or as a result of the bruise, the whole carcass should be condemned. Edible parts which show only slight reddening from a bruise may be passed for food if otherwise acceptable.

b. Contamination

Carcasses of poultry contaminated by volatile oils, paints, poisons, gases or other substances which affect the wholesomeness of the carcass should be condemned.

Direct or indirect contamination by dust, filth, exudates, purulent matter, or by live birds or diseased carcasses or organs should be avoided. This is of particular importance in the case of edible viscera, torn or incised tissues and internal surfaces of the carcass. For example, incised tissues at the point of the stick wound, or tissues exposed by cuts or tears in the skin, which pass through the contaminated scald water and mechanical pickers, should be cut off or trimmed from the eviscerated carcass.

Contamination is especially objectionable, not only for esthetic reasons, but also because it is likely to contain Salmonella, staphylococci, viruses, or other microorganisms pathogenic to man. The microorganisms are not likely to be completely removed by washing or other ordinary cleaning procedures, and any that remain represent a hazard of direct infection to man, or of contamination of other foods in the market or in the kitchen. Since cooked poultry, poultry stuffings, chicken salads, and many other perishable foods prepared in the home or in the restaurant, etc., provide excellent media for the multiplication of certain of these organisms, the eventual result of such contamination may be food poisoning for the consumer.

Edible organs, incised or torn tissues, or internal surfaces of the body cavity, when contaminated by filth or by exudative matter or otherwise from diseased tissues during or subsequent to evisceration should be trimmed off, or the entire affected part or carcass should be condemned. Skin thus contaminated should be handled in a like manner, except when the contamination is not from a disease process, affects only the outer surface of the skin, and is of a nature which can be thoroughly removed by prompt washing of the soiled surfaces. Care should be taken during such washing to prevent contamination of other tissues or other carcasses.

c. Mutilation

Tissues of mutilated carcasses which, after mutilation, have passed through scald tank or defeathering operations are inevitably contaminated. Furthermore, they are readily and frequently contaminated otherwise, and cannot be properly cleaned. Any tissues, organs, or parts of a mutilated carcass which have been contaminated following mutilation should be condemned, and if the whole carcass is affected, the whole carcass should be condemned.

d. Death Other than by Slaughter

All carcasses of poultry showing evidence of death other than by slaughter should be condemned. Such evidence includes engorgement of the heart, liver, and mesenteric vessels with blood.

e. Overscald

Overscalding results in a par-boiling or partial cooking of the exterior of the carcass. If the scald water is contaminated, the partially cooked skin is thus more

vulnerable to this contamination, and to further contamination during processing. The contaminated tissues cannot be effectively cleaned, and are subject to more rapid bacterial growth, deterioration, and decomposition than is the case with normal raw tissues. Carcasses which have been materially overscalded resulting in a cooked appearance and consistency (i.e., with loss of elasticity, and tearing readily) of the skin or flesh should be condemned.

f. Decomposition

Carcasses, or separate organs or parts, which have reached a state of decomposition evidenced by slime, foul odors or putrefaction should be condemned. Any part of a carcass which is "green-struck" should be condemned, and if the carcass is extensively affected, the whole carcass should be condemned.

h. Other

Various other conditions of adulteration, such as those resulting from rodents, insects, chemicals, etc., may be found, and should be evaluated in accordance with the definition of adulteration given in Part I, or in the law under which the inspection is made.

DISPOSITION OF DISEASED CARCASSES: SUMMARY

1. Carcasses of poultry affected with any of the following diseases should be condemned.

Tuberculosis	Osteopetrosis
Pseudotuberculosis	Listeriosis
Salmonellosis	Erysipelothrix infection
Erythroblastosis	Botulism
Granuloblastosis	Emaciation
Visceral Lymphomatosis	Psittacosis (Ornithosis)
Neural Lymphomatosis	

2. Carcasses of poultry affected with any of the following diseases in a progressive stage, or showing a general systemic disturbance, should be condemned. When the lesions are regressive and of such character and extent that there is no general systemic disturbance, only the affected parts need be condemned:

Newcastle	Infectious laryngotracheitis
Fowl typhoid	Infectious coryza
Fowl cholera	

3. Chronic respiratory disease. Any organ or part of a carcass which is affected by chronic respiratory disease should be condemned and if there is evidence of general systemic disturbance, the whole carcass should be condemned.

4. Pullorum disease. Carcasses of poultry extensively affected with pullorum disease, or showing a general systemic disturbance, should be condemned. When the lesions are localized and there is no general systemic disturbance, only the affected parts need be condemned.

5. Fowl pox. Carcasses of poultry affected with fowl pox in a progressive stage, showing general systemic disturbance, or bearing grossly visible lesions should be condemned.

6. Tumors. Any organ or part of a carcass which is affected by a tumor should be condemned. When there is evidence of metastasis, or that the general condition of the bird has been affected by the size, position, or nature of the tumor, the whole carcass should be condemned.

7. Coccidiosis. Carcasses affected with frank or acute coccidiosis, and any other carcass showing general systemic disturbance, should be condemned.

8. Trichomoniasis. Carcasses of poultry showing general systemic disturbance from trichomoniasis should be condemned.

9. Parasitism other than coccidiosis, infectious enterohepatitis, and trichomoniasis. Affected organs and parts should be condemned; e.g., gizzards infected by gizzard worms. When feet and shanks are being saved for food, those affected by scaly-leg mites should be condemned. In other instances, if signs or lesions indicate an extensive or generalized effect, condemnation should be based upon the systemic alterations manifested.

10. Inflammatory processes. Any organ or part of a carcass affected by an inflammatory process should be condemned, and if there is evidence of general systemic disturbance, the whole carcass should be condemned. This applies, for example, to carcasses showing enteritis, pericarditis, salpingitis, tendovaginitis, inflamed air sacs, pneumonia, pleurisy, peritonitis, arthritis, abscesses, suppurative sores, and the like. If there is no evidence of general systemic disturbance, only lesions and affected tissues, organs and parts need be condemned.

11. Infectious Enterohepatitis. Carcasses affected with infectious enterohepatitis should be condemned. When recovery has occurred, and when the residual lesions are of such nature and extent that there is no general systemic disturbance, only the parts containing residual lesions need be condemned.

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Part III
SIGNIFICANCE OF SPECIFIC ANTE-MORTEM AND POST-MORTEM FINDINGS, AS SEEN BY THE LAY INSPECTOR OR PLANT PERSONNEL

A guide for training the lay inspector, and for the assistance of poultry plant personnel in management of plant control systems; and a guide to the disposition of abnormal birds and carcasses on the basis of certain abnormalities, without reaching a specific diagnosis.

INTRODUCTION

It is the responsibility of management in poultry-processing establishments, among other things, to see that birds which are obviously sick are not slaughtered for human food. Likewise, during dressing or evisceration, carcasses found to be obviously unfit for food should be condemned promptly by plant management. The fact that the poultry processor and his employees may not have determined that poultry sold was diseased, or may not have determined the significance of apparent abnormalities, does not relieve them of their responsibilities under applicable food laws and ordinances. The occupational hazard to poultry plant employees from certain poultry diseases is a collateral public health problem.

Much of the poultry inspection work of the regulatory agencies, excluding, of course, the continuous ante-mortem and post-mortem inspection services, is done by inspectors trained in the consumer viewpoint and by apprenticeship and experience in the many technical sciences and skills essential to the detection of law violations. These inspectors are usually not formally educated in the science of veterinary medicine.

This Part is designed to assist the regulatory food inspector and other regulatory personnel and poultry plant personnel in evaluating ante-mortem signs or post-mortem findings as actually observed. This Part is in effect an interpretation of Part II in terms of the individual observations which can be made by the inspector or lay employee without knowledge of the specific physiological processes involved and without attempting to reach a diagnosis. This presumes that the person making the observations has been adequately trained by apprenticeship and experience to distinguish the abnormal from the normal, and is capable of recognizing evidences of abnormality, while not having the professional veterinary medical background and experience to evaluate these fully, except as to any per se repulsiveness of the condition to him as a consumer or consumer representative.

The limitations of such a guide are, of course, immediately apparent, and it is presumed that professional veterinary medical assistance will be sought where necessary for confirmation of the observations of the lay inspector.

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SIGNIFICANCE OF ANTE-MORTEM FINDINGS

(See Part I for discussion of ante-mortem procedures)

1. Birds which plainly exhibit any of the following conditions should be considered unfit for slaughter for human food.

   a. The bird is down, unable to stand.

   b. A "doughy" feeling of the skin and flesh.

   c. Partial paralysis; convulsive movements, nervous disturbances.

   d. Greatly distended abdomen containing fluid.

   e. Unkept appearance, drowsy or droopy, with abnormally reddish-purple or pale comb.

   f. "Droopy" appearance and swollen or engorged, erect snood (turkeys). (The snood is the conical unfeathered projection on the face of the turkey.)

   g. Emaciation; extreme thinness; extreme weakness.

   h. Difficult respiration accompanied by gasping, gurgling, shrill noises, by expulsion of blood; or by a discharge from the mouth, nostrils, or eyes; or by inflamed, swollen eyes; or by greatly swollen or discharging sinuses of the head.

   i. Extensive, numerous or repulsive scabs, nodules, blisters, open wounds, ulcers, abscesses, or multiple inflamed areas of skin or of underlying tissues.

   j. Multiple growths (tumors).

   k. Marked enlargement of the bones of the wings and legs.

2. Birds showing signs of illness other than as listed in 1 above should be segregated as suspects for separate slaughter.

EXAMINATION OF THE DRESSED(uneviscerated) CARCASS: SIGNIFICANCE OF FINDINGS

(See Part I for discussion of post-mortem procedures)

Carcasses, organs, or parts may be abnormal due to differences in size, position, color, shape, consistency, and odor.

The normal poultry carcass may vary in color depending upon age, breed, sex, kind of feed, amount of exercise, and type of scald. All other things being equal, the firmness of the flesh will be in direct proportion to the age of the bird. There should be no swellings about the head. The comb of normal commercially slaughtered birds may vary from red to pale red, except that the normal color is lost when a high-temperature scald is used. Fowl which have been in heavy production will have shrunken, waxey-red combs, and the normal yellow of the beaks and shanks will have diminished or disappeared. The skin of normal birds which have white, slate-colored or black shanks is usually lighter in color than that of birds with yellow shanks. Certain breeds of birds, particularly Jersey White Giants, have a greenish cast to the skin extending over the abdomen and rear part of the thighs. The shanks and feet of older birds will be more angular and will not appear as rounded as those of younger birds.

1. Dressed poultry carcasses which plainly exhibit any of the following conditions should be considered entirely unfit for use as human food. Such poultry should not be chilled, packed, eviscerated, or otherwise handled in connection with other poultry, or in any edible products department.

   a. Marked darkening and dehydration of the skin and musculature; skin abnormally taut, thin and dry, or having a leathery texture. (Trade term "Feverish") (Caution: Must be evaluated very carefully if scald temperatures above 130° F. used. See page __.)

   b. Marked abnormal paleness of the skin, comb, and musculature (anemic appearance). (Caution: Must be evaluated very carefully if scald temperatures above 130° F. used. See page __.)

   c. Multiple growths (tumors).

   d. Emaciation (marked shrinking of the muscles, particularly of the breast muscles, "razor-blade" breast).

   e. Greatly distended abdomen containing fluid ("water-belly").

f. Extensive, numerous, or repulsive scabs, nodules, blisters, open wounds, ulcers, abscesses, or extensive inflamed areas of skin or of underlying tissues, including inflammatory subcutaneous emphysema (gas under the skin).

g. Marked enlargement of the bones of the wings and legs.

h. Repulsively odorous processes.

i. Mutilation (tissues mutilated during processing are likely to be contaminated).

2. Dressed poultry carcasses which plainly exhibit any of the following conditions in any degree should be handled as suspect. In regulatory work, when a sample is being drawn from a lot of dressed poultry for post-mortem examination, carcasses showing any of these conditions, as well as those exhibiting any condition listed in (1) above, should be included in the sample:

a. Abnormal reddish, bluish, or greenish discoloration of the skin, (unless obviously caused by bruises, in which case evaluate as a bruise).

b. Abnormally pale, blue, or dried-out appearance of the comb.

c. Skin or flesh thickened or containing excess fluid.

d. Blisters, nodules, scabs, open wounds, ulcers, abscesses, or sores of the skin or underlying tissues.

e. Separation of the skin from the muscles due to the presence of underlying gas, pus, or fluid.

f. Skin discolored due to underlying inflammation.

g. Marked thinness.

h. Raised areas or enlarged parts (swellings).

i. Growths (tumors) of the skin, muscles, connective tissue, nerves or bones.

j. Enlarged bones or joints.

k. Swelling adjacent to the eye due to the presence of pus.

l. Abnormally odorous condition of all or part of the carcass.

m. Abnormally enlarged, pendulous crop (may be accompanied by scratched or scurfy skin over the crop area).

INTERNAL EXAMINATION: SIGNIFICANCE OF FINDINGS

Following the opening of the body cavity, examination should be made for fluid, loose eggs, yellow cheesy material, and an odor of decomposition. The visceral organs and the internal surfaces of the body cavity and the crop should then be examined.

1. Poultry carcasses which plainly exhibit any of the following conditions should be considered unfit for use as human food.

   a. Yellow, semi-solid/or solid accumulations of pus, fluid containing flaky substance, or slimy or stinking matter on the viscera, or in the body cavity or the crop.

   b. Numerous, extensive or repulsive growths inside the carcass.

   c. Emaciation, as evidenced by extreme thinness and little or no fat on the heart crown.

   d. Inflamed, abnormally red appearance of the lining of the body cavity and of the intestines.

   e. Marked engorgement of mesenteric veins with blood, indicating death other than by slaughter.

   f. Pronounced thickening of the lining of the body cavity or the walls of the intestines, or extensive adhesions (matting together) of the viscera and the lining of the body cavity.

2. The following abnormalities are evidences of disease processes, and all affected edible tissues and organs are unfit for human consumption. The entire part or carcass may be unfit, depending upon correlation with ante-mortem signs, the nature of other lesions present within the carcass or other carcasses of the lot, or the extent or repulsiveness of certain of the individual conditions.

   a. The Liver

      Examine the liver by feeling it between the thumb and fingers, noting its size, shape, color, and consistency. The following characteristics are important:

      The normal liver of fryers and broilers has a uniform deep red color, and is of a firm, uniform consistency.

      In normal fryers and broilers of the same size, the livers are also remarkably uniform in size and color. The livers of normal older fowl may, however, vary markedly in color and consistency.

Normally the livers of fat fowl are soft and break readily. They may vary in color from dark red to pale yellow to a milkish white, depending upon the character of the feed and amount of fat in the liver.

In old roosters, the livers are normally firm with a deep red color.

The livers of normal turkeys are darker and firmer than the livers of normal chickens.

The following conditions render the liver unfit, and should be correlated with other findings in determining fitness of the carcass:

(1) Swelling, with green or brownish color.

(2) Swelling, with crumbly texture.

(3) Swelling, with grayish granular surfaces.

(4) Swelling, cherry red color.

(5) Swelling, with bluish sheen.

(6) Swelling, engorgement with blood.

(7) Great enlargement.

(8) Enlargement, with roundish, sunken, ulcer-like areas on surface.

(9) Enlargement, with soft white or gray appearing areas.

(10) Enlargement, with irregular raised ulcer-like areas.

(11) Green color.

(12) Shrunken in size.

(13) Yellowish nodules.

(14) Abnormally hard and firm texture.

(15) Granular, soft, mushy texture.

(16) Sandy consistency.

(17) Small white or grayish areas.

(18) Small, black hard deposits.

(19) Hard, firm, whitish nodules.

(20) Red or bloody spots.

(21) Rupture, with fresh or coagulated blood.

(22) Fibrous or plastic covering.

(23) White granular deposits on or under the capsule.

(24) Tumors.

(25) Cysts (fluid filled sacs).

Bile stained livers from which the stain cannot be removed by washing are unfit for use as human food.

A simple test to determine if a fresh liver is swollen or shrunken is to lay it on a level surface and cut halfway or more through the liver with a sharp knife. If the liver is swollen, the liver substance will push the edges of the cut apart. If it is shrunken (probably a rare occurrence) the edges of the cut will turn in. If it is normal, the edges will merely lay back together again. This is not applicable to livers which have been frozen.

b. <u>The Spleen</u>

The spleen is examined visually and by palpation. It is normally a deep bluish red in color, or less frequently, a deep red. It may vary considerably in size and still be normal. It is reasonably firm, particularly in young birds.

<u>The following abnormalities may be apparent in the spleen, and should be correlated with other findings in determining fitness of the carcass</u>:

(1) Tumor or other enlargement.

(2) Bright cherry red color.

(3) Grayish color, or grayish spots on the surface.

(4) Marked shrinking.

(5) Crumbly texture.

(6) Firm hard nodules of various sizes.

(7) Rupture.

c. The Intestines

The intestines of commercially slaughtered birds are normally filled with feed and in the upper portion are of a pinkish color on the outside surface. The ceca (blind pouches) and lower intestines are usually dark, due to the color of the fecal contents.

The following conditions of the intestines are abnormal and should be correlated with other findings in determining fitness of the carcass.

(1) Reddish diffuse or focal discoloration on either the external or the internal surfaces; may contain free blood which may be visible through the intestinal wall.

(2) Intestines shrunken and tightly coiled.

(3) Intestines matted together or grown to other surfaces.

(4) Nodules or tumors on the external surfaces, or ulcers on the internal surfaces.

(5) Plugs of slimy or solid exudative matter, sometimes bloody, with dilations in front of the plugs.

(6) Intestines flabby and dilated; or conversely, with the walls firm and thickened. (Not to be confused with post-mortem changes.)

d. The Pancreas

The pancreas is contained within the first fold of the intestine. It is normally a homogeneous, pale, pinkish white in color. Excepting for tumorous growths, the only condition of the pancreas which is considered of significance is the development of a chalky color and ladder-like injections on its surface, when accompanied by some degree of darkening and dehydration of the skin and flesh of the carcass. Carcasses exhibiting this combination of lesions are diseased and may not be used as human food.

e. <u>The Kidneys</u>

The kidneys of birds are normally a deep red and lie in the bony structure of the back. Only the lower surface and sides are available for examination. The kidneys should be removed as a part of preparation of the carcass. The tubes (ureters) which carry the excretion from the kidneys are normally prominent. Urates are precipitated in these tubes in case of starvation, dehydration, or disease.

<u>The following conditions of the kidneys are abnormal and should be correlated with other findings in determining fitness of the carcass</u>:

(1) Swollen, cloudy appearance.

(2) Grayish white areas, with or without swelling.

(3) Distended white ureters (tubes which lead from kidneys to cloaca; they are visible on lower surface of the kidneys).

(4) Chalky deposits on or in the kidneys.

(5) Bloody spots on the surface or in the substance of the kidney.

(6) Cysts (fluid-filled sacs) on or in the kidney. (Not to be confused with the cyst sometimes seen in the non-functioning remnant of the right oviduct.)

(7) Mottled appearance, showing two colors in wavy stripes.

(8) Localized swellings.

(9) Tumors.

(10) Swelling and congestion.

(11) Thickened, fibrous capsule.

(12) Swelling, with grayish gramular surface.

(13) Hard white nodules.

f. The Lungs

The lungs from normal birds show considerable elasticity, are normally pink in color, and are light in weight. It is difficult to detect abnormalities in lungs from carcasses which have been frozen. (Although not a result of disease, the lungs of New York dressed carcasses chilled in water or ice slush may become distended with water and may appear solidified. This is, of course, a potential source of contamination because such water may also enter the air sacs; and in any event removal of contaminated lungs is likely to result in contamination of the interior of the carcass. Congestion of the lungs with chill water interferes with evaluation of lesions which may be present.)

The following conditions of the lungs are abnormal and should be correlated with other findings in determining fitness of the carcass:

(1) Adhesions (growths to the ribs and inter-rib spaces).

(2) Brown, yellow and red discoloration.

(3) Consolidation, with a consistency similar to that of the liver.

(4) Firm, hard, caseous nodules.

(5) Tumors, swellings, abscesses, and the like.

g. The Heart

The heart is composed almost entirely of muscle. In commercially killed birds, it usually has considerable fat at the base and a band of fat located spirally around its mid-portion. The heart is contained in a covering sac known as the pericardium.

The following conditions render the heart unfit, and should be correlated with other findings in determining fitness of the carcass:

(1) Fibrinous thickening of the heart sac.

(2) White chalky material on or under the heart sac.

(3) Very small red spots (hemorrhages), particularly apparent on the fat.

(4) Diffuse growths distorting normal shape.

(5) Scars and cheesy abscesses in the heart muscle.

(6) Growths on or within the heart.

(7) Heart anemic (pale).

(8) Engorgement of the heart muscle with blood (congestion).

(9) Yellow to tan cheesy or flaky material in fluid in the sac holding the heart.

(10) Adherence of heart sac to the heart.

(11) Excess fluid in the heart sac.

(12) Enlarged and distorted heart, with grayish-white nodules, abscesses or necroses.

(13) Small, irregular yellowish or grayish raised areas on the heart muscle.

h. <u>The Gizzard</u>

The gizzard is a heavy, muscular organ with a tough lining. The muscles are a very deep, dark red with a purplish sheen. The fat covering the gizzard and the proventriculus (the spindle-shaped glandular stomach just in front of the gizzard) should be examined.

<u>The following changes render the gizzard unfit, and should be correlated with other findings in determining the fitness of the carcass:</u>

(1) Slimy, brownish degeneration of the fat.

(2) Pinpoint or larger blood spots in the fat and muscle.

(3) Abscesses in the muscle.

(4) Foreign bodies piercing the wall.

(5) Yellowish or grayish white areas in the musculature.

(6) Tumors and infiltrating growths.

(7) Parasites in the musculature wall. These parasites can best be demonstrated by examining the inner surface of the gizzard after the lining has been removed. They are apparent as deep indentations into the normally smooth inner surface of the gizzard.

i. The Proventriculus

The proventriculus of birds is a thick-walled, spindle-shaped, dilation of the gullet located between the crop and the gizzard. It is analagous to the stomach of other animals.

The following conditions of the proventriculus are abnormal and should be correlated with other findings in determining the fitness of the carcass:

(1) Great distention and engorgement.

(2) Inflammation as evidenced by swelling and reddening.

(3) Abnormal paleness and greatly thickened wall with a white, soft, scurfy lining.

(4) Tumors, abscesses, or foul-smelling contents.

j. The Crop

The crop in chickens and turkeys is a thin-walled sac arising from the esophagus. Its lining is normally grayish to pinkish white with a pebbly surface. Although the crop naturally has the odor of the feed and mucous secretion, the normal odor is not offensive.

The crop of the duck and the goose is merely the spindle-shaped esophagus which dilates to store the food until it can be handled by the gizzard.

Any of the following conditions of the crop are abnormal and should be correlated with other findings in determining the fitness of the carcass:

(1) Odors of decomposition (sour, offensive odor).

(2) Dilation of the crop with an unusually large quantity of food or other materials. Ulceration may be evident. With this pendulous crop, odors of decomposition may be present.

(3) Thick, white, soft scabs or firm, yellowish or grayish cone-shaped raised areas on inner surface.

(4) Inflammation, with a red "angry" appearance of the inner surface.

k. The Reproductive Organs

The reproductive organs normally vary greatly depending upon age, sex, nutrition, and state of the reproductive cycle. The ovary may vary in size from a small pinkish structure in the young females to a large mass of pendulous yolks in various stages of development in the mature birds. The oviduct likewise varies from an almost imperceptible structure extending along the lower surface of the backbone from the ovary to the cloaca, to a voluminous pinkish-gray or white structure with soft, thick walls. Normally only the left ovary and oviduct develop in birds. In males, both testes develop. The testes vary from the size of a grain of wheat in broilers to kidney-bean shaped structures one or two inches long in mature cocks.

The following conditions in the reproductive organs are abnormal and should be correlated with other findings in determining fitness of the carcass.

(1) Grayish or greenish ova.

(2) Cysts on the ovary may develop into grape-like clusters.

(3) Tumors of the ovary, oviduct or testes (the majority of malignant tumors which are found in other visceral organs originate in the ovary).

(4) Presence of eggs or ova in the abdominal cavity with or without rupture of the oviduct.

(5) Abscesses, tumors, or inflammatory processes of the oviduct.

(6) Protrusion of the oviduct through the vent, with accompanying inflammation.

(7) Impacted oviduct.

1. The Cloaca

The cloaca is the structure into which the intestinal, genital, and urinary tracts empty. It is located just in front of the vent through which it voids. It is a pale egg-shaped structure when filled and normally contains both urinary and intestinal excrement.

The following changes in the cloaca are abnormal and should be correlated with other findings in determining fitness of the carcass:

(1) Distention with large masses of white, chalky material.

(2) A foul odor or fluid or bloody discharge from the vent.

(3) Involvement with tumors.

(4) Reddened, hemorrhagic, or inflamed appearance.

GLOSSARY

Acute	Having a short and relatively severe course.
Anemia	A deficiency of the blood, either in quantity or quality. The quality deficiency is usually one of either hemoglobin or red blood cells.
Anorexia	Lack of appetite.
Ante-Mortem	Before death (before slaughter).
Arthritis	Inflammation of a joint or joints.
Ascites	An abnormal collection of fluid in the abdominal cavity (water belly).
Asymmetric	Not affecting the parts of both sides equally.
Ataxia	Incoordination of muscular action; staggering gait.
Atrophy	A defect or failure of nutrition of the tissues manifested as a wasting away or diminution in the size of tissue, organ or part.
Bacillemia	Presence of bacilli in the blood.
Bacteremia	Presence of bacteria in the blood.
Cachexia	A condition of weakness with emaciation, or general ill health and malnutrition.
Caseous	Cheesy.
Catarrh	Inflammation of a mucous membrane, with excessive discharge.
Clonus	Spasm in which rigidity and relaxation alternate.
Conjunctivitis	Inflammation of the mucous membrane of the eye and lining of the eyelids.
Cyanosis	A bluish discoloration of the skin (including wattles and comb) from deficient oxygenation of the blood.

Derma	Skin.
Diphtheric Membrane	A scab-like covering formed on a mucous membrane.
Edema	Excessive accumulation of body fluids in the tissue spaces.
Enteritis	Inflammation of the intestines.
Exudate	As used here, a substance deposited in or on the tissues by a disease process.
Fibrin	A whitish, insoluble protein material involved in the clotting of blood.
Fibrinous Exudate	Coagulated exudate, sometimes plastic in appearance, held together with fibrin.
Flaccid	Soft, flabby relaxed; lacking "tone".
Friable	Easily Broken or crumbled.
General Systemic Disturbance	Affecting the general health of the bird, hence, the fitness of the entire carcass. Would specifically include any evidence of septicemia, bacteremia, viremia, or toxemia; fever; abnormal loss of weight or emaciation.
Hydropericardium	A collection of fluid with the pericardial sac.
Hyperemia	Excessive blood in a part.
Inappetence	Loss of appetite.
Mesentery	A fold of the peritoneum that connects the intestine with the dorsal abdominal wall.
Metastasised	Transferred to new sites by way of the blood or lymph, or by extension. (Said of a malignant tumor.)
Morbid	Diseased; pertaining to disease.
Moribund	In a dying condition.
Mucopurulent Exudate	Mucus containing pus.
Mucosa or Mucous Membranes	The membranes lining those cavities and canals communicating with the air.
Necrosis	Dead or dying tissue surrounded by living tissue.

Paresis	Slight or incomplete paralysis.
Pathogenic	Causing disease.
Pericarditis	Inflammation of the heart sac.
Peritonitis	Inflammation of the peritoneum, the serous membrane which lines the abdominal cavity and contains the viscera.
Petechial Hemorrhage	Hemorrhage in the form of minute spots or pin points.
Pleurisy	Inflammation of the pleura, the serous membrane which envelops the lungs and lines the thorax.
Pneumonia) Pneumonitis)	Inflammation of the lung.
Post-Mortem	After death or slaughter.
Punctate	Dotted.
Purulent	With pus formation.
Salpingitis	Inflammation of the oviduct.
Septicemia	An infection characterized by the presence in the blood of bacteria or other pathogenic organisms and their associated poisons.
Serosa	Serous membranes, the membranes lining the closed cavities of the body, i.e., the peritoneum and the pleura.
Serofibrinus Exudate	Serous fluid containing flakes or shreds of coagulated material.
Serous Exudate	Consisting largely of serum; serum-like.
Spastic	Pertaining to spasm or sudden muscular contractions.
Synovial Membrane	A membrane covering the ends of the bones and the inner surface of the ligaments making up a joint.
Synovial Sheath	A synovial membrane which lines a cavity through which a tendon glides.
Toxemia	A general intoxication due to the absorption of bacterial products (toxins) formed at a local source of infection.

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